PHILOSOPHY OF WHEAT CULTURE.

No apology need be made to our readers for the number of articles we have given of late, of a character similar to the following:—

The Philosophy of Wheat Culture is a subject pre-eminently demanding the investigation of reading and thinking farmers, at the present time; and we are happy to know, that quite a number, especially of young farmers, are begining to devote much study to this science.

We are aware that the terms *science* and *philosophy*, in connection with wheat culture or any other branch of the farmer's art, only excite a *sneer* in the minds of some; but let them sneer as they please, it is nevertheless true, that the time is speedily coming, in this and other countries, when farming can no longer be prosecuted with advantage except by those who have made themselves familiar with the principles of science and philosophy, and understand how to apply those principles in their practice of the great art of agriculture.

The following article was prepared by our friend "D. L." and read at one of the agricultural meetings recently held in the State House, at Albany.

"Mr. President:—The question for investigation, this evening, I believe to be this:—'Is it practicable, and if so, will it be profitable, to grow wheat south of the limestone strata that extend west to Lake Erie, through the central portion of this State?'

"The soil in the region alluded to is based on shale and free-stone rocks, and, lacking lime, its sulphates and phosphates, it is but poorly adapted to wheat culture.

"Practically, then, the question to be solved is this:—How much lime, sulphur, and phosphorus must be added to the shale and free-stone soils, in the southern tier of counties, to make them good wheat lands, and what will be the expense per acre?

"If we take 100 lbs. of ripe wheat, including root, stem, and head, and burn it in the open air, about 97 per cent. of its weight will be converted into vapor and gas, and escape into the atmosphere. The ash, or 3 per cent. left, will, on analysis, show the earthy elements necessary to produce this grain. Liebig and Johnstone both quote the following anaysis, made by Sprengel, as ent'tled to confidence:—

	Wheat ash.
Potash	0 6
Soda	0 8
Lime	6.8
Magnesia	0 9
Silica, (flint)	81.6
Alumina, and oxide of iron	2 6
Phosphoric acid	4 8
Sulphuric acid	1 0
Chlorine	0 9—100 00

"When it is recollected, that there is never more than three or four per cent. of the above earthy substances in wheat, and that Silica (sand) composes 81.6 per cent. of even that small portion, it will not, I trust, be deemed incredible if I express the opinion that, by the aid of a little practical science, good wheat may be grown profitably in any county in the State.

"This plant has been raised in a great variety of artificial soils, where each ingredient was carefully weighed, both before and after the plant was taken from the earth. By careful analysis, what the soil had lost, and what the plant had gained, was susceptible of demonstration. A very large portion of the elements of all cultivated plants come from the atmosphere. The precise amount depending alike on the composition of the soil and the nature of the particular plant upon which the experiment was made.

I regard it as a fact of great practical importance, that wood-ashes, (even leached ashes, so abundant in the southern tier of counties,) contain all the earthy elements of this invaluable bread-bearing plant. Compare the following table, showing the constituents of beach ash, with that of wheat ash,—(this is also taken from Sprengel:)—

	Beech ash.
Silica, (sand)	5.52
Alumina, (basis of clay)	2.33
Oxide of iron	3.77
Oxide of Manganese	3.85
Lime	25.00
Potash	22.11
Soda	3.32
Sulphuric acid	7.65
Phosphoric acid	5.62
Chlorine	1.84
Carbonic acid	14.00=100.00

"Maple, birch, and other wood, contain the same minerals.

"Note the 25 per cent. of lime, in the above analysis, being larger than that of potash. Our primitive forests have been for centuries drawing the above earthy constituents of wheat from the soil; and instead of carefully preserving this indispensible *raw material* of good wheaten bread, thousands of bushels of leached ashes have been thrown away! Being but slowly decomposed by the vital action of plants, ashes are an enduring fertilizer when compared with stable manure. Mixed with quick lime, their good effects are more speedily obtained. Lime will render alumina, either in the soil or in leached ashes, soluble in water, so that it can enter the minute pores of roots. Clay in the soil is always combined with a large portion of silica; and before it has been exhausted by continual cropping, it holds in combination considerable potash and soda. Lime, by combining with alumina, the basis of clay, liberates these alkalies and silica, which uniting chemically, form soluble silicates of potash and soda. These also enter into the circulating nourishment of plants, and are decomposed in the stems of grasses and cereals. The silica goes to make vegetable bone, to keep the plant upright; while the potash and soda go back to the earth, to dissolve, as before, another portion of *sand*, to be also absorbed, and transformed into *bone*. It is in this way that a few ashes, applied to a sandy soil, will enable grass and grain to take up the 81 per cent. of flint found in their ashes. Lime will do the same thing on clay soils, for the simple reason that they generally do not lack potash, soda, and magnesia.

"The quantity of lime and ashes to be applied to an acre, will depend entirely on their cost at the place where they are to be used. A few bushels will be of essential service; but a larger dose will be better.

"I come now to speak of the organic elements of the wheat plant, which as I have already intimated, form 96 to 97 per cent. of its substance. Water and its constituents, oxygen and hydrogen, carbon and nitrogen, are the four elementary ingredients of all cultivated plants, beside their minerals. As there is no lack of water or of its elements oxygen and hydrogen, our attention will be confined to obtaining a full supply of carbon and nitrogen. These are indispensible, and fortunately nature has provided an amount of carbon and nitrogen in the air, if not in the soil, more than equal to all the wants of vegetation. A large portion of the fertilizing elements of vegetable mould, in a rich soil, is carbon, and a small portion is nitrogen; both of which are usually combined with other substances. These important elements are often nearly exhausted in fields which have been unwisely cultivated; and I have paid much attention to the subject of cheap and practicable renovation.

"By the aid of clover and buckwheat dressed with gypsum, ashes, lime, or manure, and plowed in when in blossom, much can be done in the way of augmenting the rich vegetable mould so desirable, to a certain degree, in all soils. Straw, corn-stalks, leaves of forest trees, and swamp muck, made into compost with lime and ashes, are of great value. Charcoal well pulverised, and saturated with urine, I regard as the cheapest and most useful fertilizer that can be applied to a poor soil, for the production of wheat or almost any other crop.

"The earths contained in charcoal, as the analysis of its ash demostrates, are identical with the earths found in the wheat plant. Coal contains a very large portion of carbon, and will imbibe from the atmosphere a large quantity of nitrogen in the form of ammonia and its carbonates. Unlike stable manure, the salts of lime, potash, soda and magnesia, it will not waste by premature solution nor by evaporation. On the contrary, it is of incalculable value to mix with the liquor and solid excretions of all animals, to absorb and fix in a tangible condition those volatile, fertilizing elements, which are so prone to escape beyond our reach.

"When it is recollected that without nitrogen in some form it is utterly impossible to grow one kernel of good wheat,